EVOTING OF MUKTAMAR 20th IKATAN PELAJAR MUHAMMADIYAH USING CODEIGNITER

This is aranged to complete a prerequisite study program

at the Department of Informatics Faculty of Communication and Information

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FACULTY OF COMMUNICATION AND INFORMATION
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2017

THE APPROVAL PAGE

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It has been defended in Front of Examiners
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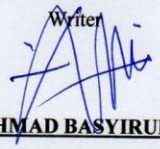

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292/A.4-II.3/INF-FKI/XI/2017

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Program Studi	:	Informatika
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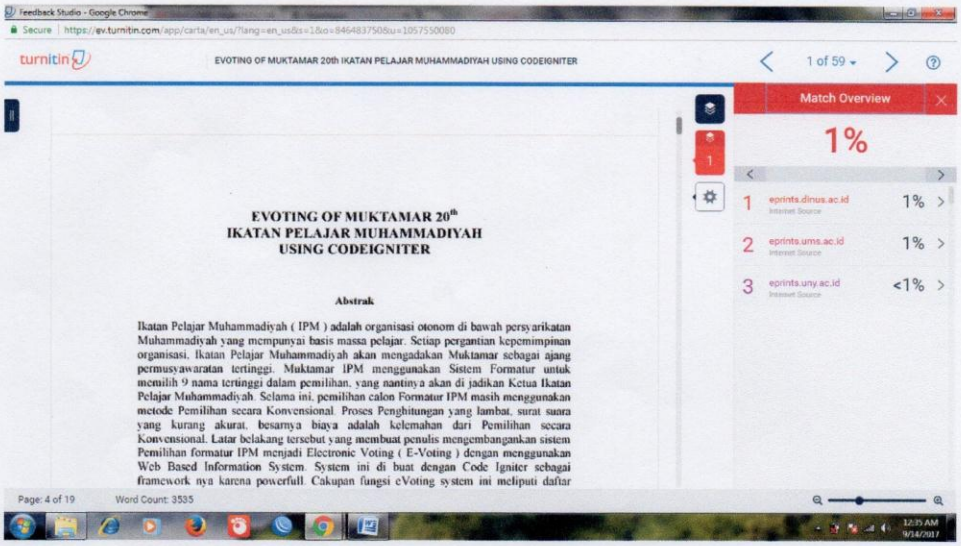

EVOTING OF MUKTAMAR 20th IKATAN PELAJAR MUHAMMADIYAH USING CODEIGNITER

Abstrak

Ikatan Pelajar Muhammadiyah (IPM) adalah organisasi otonom di bawah persyarikatan Muhammadiyah yang mempunyai basis massa pelajar. Setiap pergantian kepemimpinan organisasi, Ikatan Pelajar Muhammadiyah akan mengadakan Muktamar sebagai ajang permusyawaratan tertinggi. Muktamar IPM menggunakan Sistem Formatur untuk memilih 9 nama tertinggi dalam pemilihan, yang nantinya akan di jadikan Ketua Ikatan Pelajar Muhammadiyah. Selama ini, pemilihan calon Formatur IPM masih menggunakan metode Pemilihan secara Konvensional. Proses Penghitungan yang lambat, surat suara yang kurang akurat, besarnya biaya adalah kelemahan dari Pemilihan secara Konvensional. Latar belakang tersebut yang membuat penulis mengembangankan sistem Pemilihan formatur IPM menjadi Electronic Voting (E-Voting) dengan menggunakan Web Based Information System. System ini di buat dengan Code Igniter sebagai framework nya karena powerfull. Cakupan fungsi eVoting system ini meliputi daftar Pemilih dan Formatur, QR Code Generate, Rekapitulasi suara, dan reVoting. Web Service juga di gunakan sebagai komunikasi antar Client dan Server dalam System Information ini. Sehingga kelemahan metode Pemilihan secara Konvensional dapat dikurangi proses pemilihan formatur yang dilaksanakan pada Muktamar 20 Ikatan Pelajar Muhammadiyah, di Samarinda 12 – 16 November 2016.

Kata Kunci: eVoting, QR Code, IPM

Abstrak

Muhammadiyah Student Association (IPM) is an autonomous organization under of Muhammadiyah Organisation who have student as base mass. Every replacement of leadership of the organization, Muhammadiyah Student Association will hold a Muktamar as the highest deliberative congrest. Muktamar IPM uses Formatur System to select 9 the highest name in the election, which will be made chairman of Muhammadiyah Student Association. So far, the election of candidates formatur of IPM are still using Conventional Election methods. The calculation were slow process, ballots less accurately, the high cost is a disadvantage of the Conventional Electoral. This background that makes the author developed a system of Election formatur IPM into the Electronic Voting (e-voting) by using a Web Based Information System. System is created by using Code Igniter as the PHP Framework because its powerful. This eVoting System have functional scope that covers the List of Voters and Formatur, QR Code Generate, Recapitulation, and reVoting. Web Service is also used as the communication between Client and Server in this Information System. So that weaknesses of Conventional Election method can be reduced for Formatur electoral process when carried out at the Muktamar 20th of Muhammadiyah Student Association at Samarinda 12 – 16 November 2016.

Kata Kunci: eVoting, Code Igniter, IPM

1. INTRODUCTION

Muhammadiyah Students Association / Ikatan Pelajar Muhammadiyah abbreviated IPM is one of the Autonomous Organization which is owned by Muhammadiyah Organization. Is the Student Islamic Movement, Da'wah Amar Ma'ruf Nahi Munkar which is based on the Quran and Sunnah Rasulullah. This organization was founded in Surakarta on 5 Shafar 1381 Hijriyah coincided with July 18, 1961 Miladiyah. Same as Muhammadiyah, IPM has thousands or even millions of cadres who are spread all over Indonesia. Muhammadiyah Schools, Public and Private Schools, Communities and Village is the base mass for deployment cadre of IPM.

IPM have the Structure Organizations that arranged neatly. Leaders of Pimpinan Ranting is located at School. Pimpinan Cabang is located in the District Area. Pimpinan Daerah representing regional area. Pimpinan Wilayah who are in the province. And the Pimpinan Pusat as top leader of Muhammadiyah Student Association. As this outline, Pimpinan Pusat that organize Muhammadiyah Students Association in Indonesia.

In the Statutes Anggaran Dasar and Anggaran Rumah Tangga IPM, this organization has a complete management of rules. One of them is the rule leader replacement. The purpose of this leader replacement is for the passage of the regeneration process of the organization. IPM adopts Deliberation in deciding on a result or cause. Similarly, in Leadership replacement IPM, Deliberation is a must in this rule. As well as Muhammadiyah Muhammadiyah, IPM doing replacement Leadership uses the concept of Formatur. This concept sets some of the Chairman in an organization with at commanded by The General Chairman.

Muktamar is the highest deliberation in the Association, which is held directly by the Pimpinan Pusat Muhammadiyah Student Association. Participants of this event are representatives of all the Pimpinan Daerah and Pimpinan Wilayah of Muhammadiyah Students Association in Indonesia. One of the results of the Muktamar is the election of Formatur and one that will become a leader of Pimpinan Pusat Muhammadiyah Student Organisation in the next period. In November 2016, the Pimpinan Pusat of Muhammadiyah Student Association will hold a Muktamar 20^{th} in Samarinda, East Kalimantan.

In conducting the Election ofCandidates Formatur over the years, Muktamar Muhammadiyah Student Association that held by Pimpinan Pusat is still using conventional methods. This method still uses the Paper Print as ballot, and then counted by manually. Assuming Muktamar 20^{th} participants Muhammadiyah Student Association about 1000 cadres, then obviously this will cause a

big cost. The calculations would be very long, because takes Legitimate precision. Any accounting errors can occur because of human error.

With several these problems, came the idea to create Election Candidates Formatur Muktamar 20th Muhammadiyah Student Association using Web-Based Information System Electronic Voting (eVoting) in full methods. Refers to Muktamar Muhamamdiyah in Makassar, Muhammadiyah has begun to start counting with Information Systems. Although Muhammadiyah was not making full yet to use this eVoting system. Still use paper, but the calculations are already using computers automatically.

In the manufacture of eVoting Muktamar, the author refers to the eVoting existing models such as the E-Vox, MarkPledge, and e-VOTE. Actually, besides these three systems there are many models of eVoting which has been developed in various places. The author takes the third model as a study reference literature that focuses on privacy and security. For example E-Vox System, this system has a module named Administrator in charge of validating the ballots and camouflaging. MarkPledge have the concept of verification of the vote count, which in this case the author uses reVoting later. While the e-VOTE validation is must done twice, as the CA (Certification Authority).

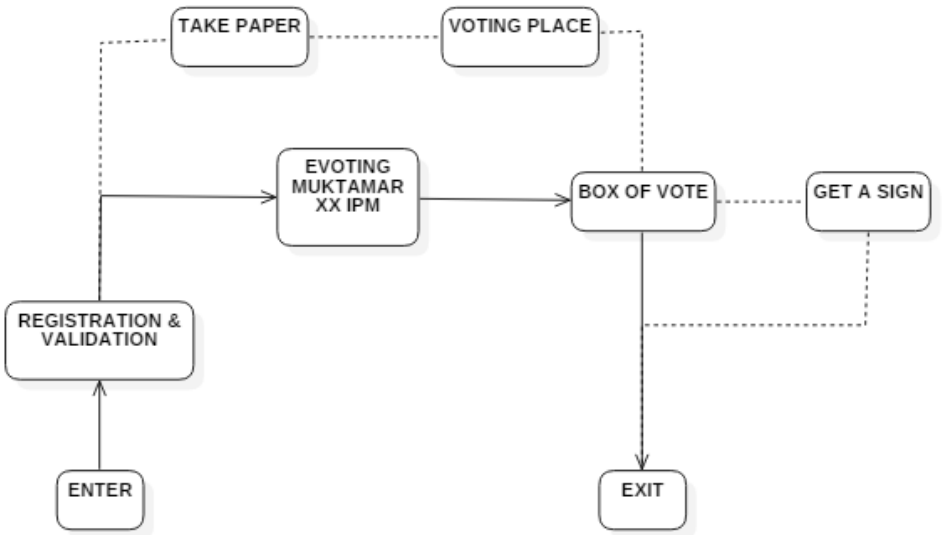

Figure 1Flow eVoting Muktamar 20th IPM

The main concept eVoting is that voters will have ID Card and a special code which is generated randomly. This code will be provided by the committee registration as proof of legitimate voters. Voters will go to the voting booth that contains the computer. Then voters insert the code into system login page and select 9 candidates formatur IPM. Automatically the voting rights would be lost if voters had an election, and voter ID card will be made as a Voter Verified Paper Audit Trail. Database elections will be stored on server on which just few people have access to these.

Based on that background, then at this Final Project Report, the writer proposes to create Electronic Voting (eVoting) Web Based at the Muktamar 20th Muhammadiyah Student Association in Samarinda, East Kalimantan in 2016. In the hope to produce effective and efficient Election of Formatur Muhammadiyah Student Association.

2. METHOD

Method is a recommended way to do somethings. The systems approach is the basic methodology to solve any problem. Information system development methodology means of a method used to carry out the development of computer-based information systems. Based System Development Life Cycle there are several methods that can be used as a model in the development of information systems. One method under the System Development Life Cycle is a Waterfall. This model develops a system with five stages arranged like waterfall concept (Fig.2). It stages s planning, analysis, design, implementation, operation and maintenance.

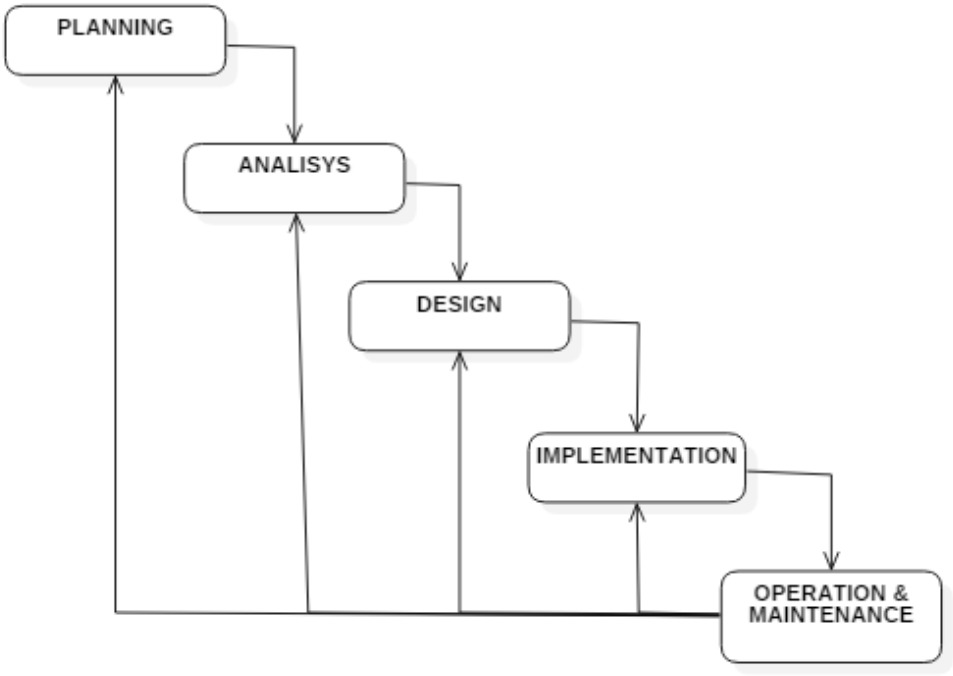

Figure 2 Waterfall Modell

Planning Stages is the initial stage in developing information system of eVoting Muktamar 20th Muhammadiayah Student Association. This stage begins with the collection and flow requirement is needed. From the result of communication with the Committee, There are three flow in the process of eVoting Muktamar 20th Muhammadiyah Student Association. The workflow is Register, Election, and calculation.

After planning stages of the Waterfall Model is Analysis. At this stage it will be in describing the concept of the information system architecture eVoting Muktamar 20th Muhammadiyah Student

Association. The author uses the concept of Object Oriented Programming (OOP) and Unifed Modelling Language (UML) to facilitate the design and development of systems. UML is a modeling language for systems or software that is object-oriented paradigm. Modelling actually being used for simplification Problems of the complex such that it is easier to learn and understand. There are some diagrams which I used in the making UML, there are Use-Case Diagram, Activity Diagram and Sequence Diagram.

Use case is the beginning of construction which describe the system in the side of the user. Target use-case of this model is that users can understand how the flow should he do. In the information systems eVoting Muktamar 20th Muhammadiyah Student Association there are two entities contained in the Use Case Diagram (Fig.3), namely Voter and Administrator. Voter can only make an election with an access code that has been given administrator. While Adminitrator have full access rights in See Calculation, Create Read Update Delete (CRUD) Formatur and Voter. But he was not able to vote, as practiced by the voter

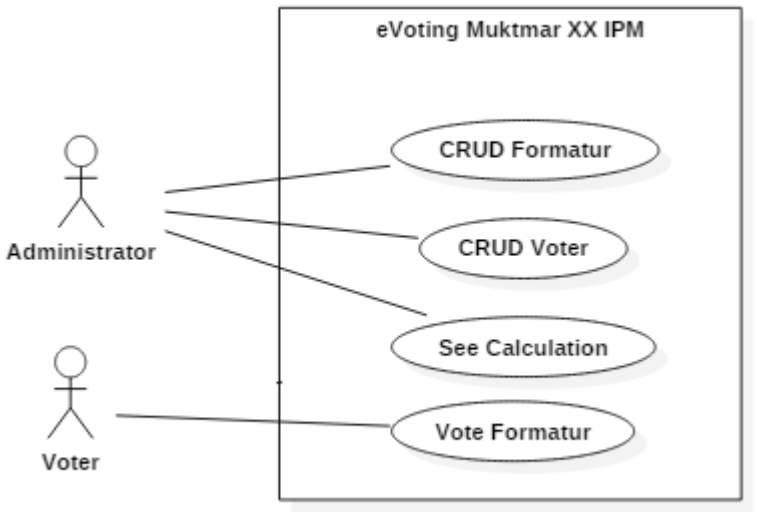

Figure 3 Use-Case Diagram

While for Activity Diagram (Fig.4) is used to create the workflow of a system from the beginning to the end of the process. Registration is the process by which participants and candidates of formatur to register with committee. Voters which able to vote is the Muktamar participants which have registered and validated by the committee, there is Formatur of the Pimpinan Pusat last period, Pimpinan Wilayah and Pimpinan Daerah in Indonesia. The committee will give the rights / access code to voters in the election. The access code is useful as an access login for election to the Muktamar 20th eVoting system. One Man, One Vote, One Voters will only get the Voting Rights.

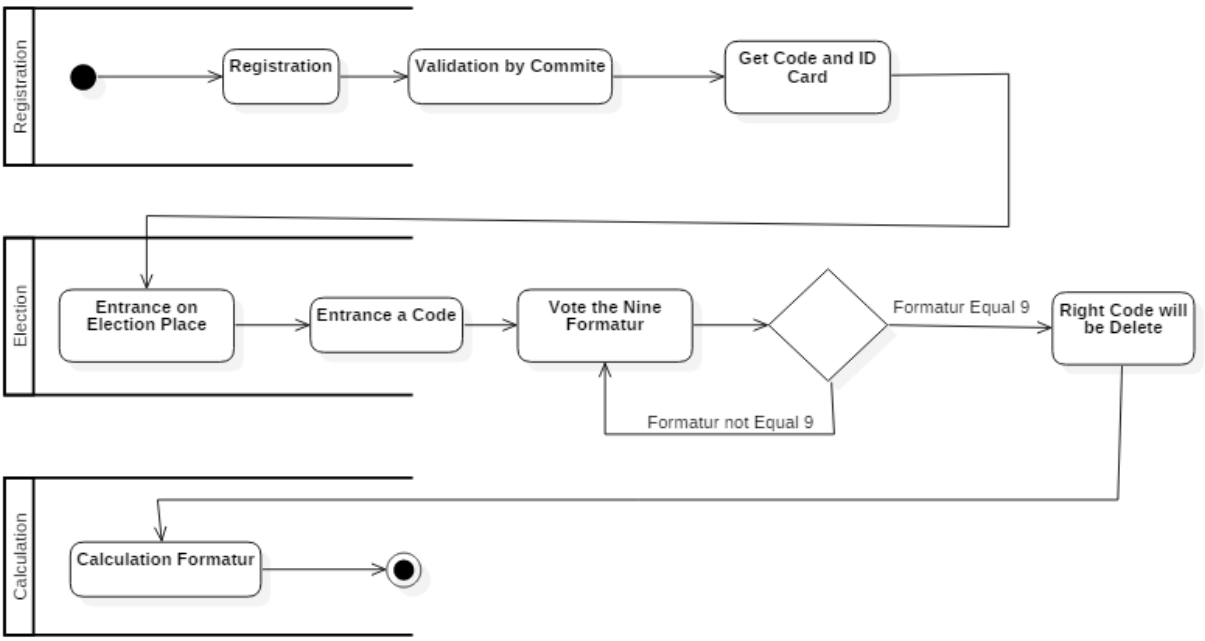

Figure 4Activity Diagram

In the process of the election, voters will go to the election booths and enter a code that has been provided by the organizers to the Muktamar 20th eVoting system. The concept is in use for the election is of Formatur Method, so voters will choose nine candidates formatur at a time. When voters already use their voting rights, the voting rights will was automatically deleted. Then the voter ID card must be entered into the Voice Box as the Voter Verified Paper Trail. It serves as the physical proof of voters have used their right to vote.

For the calculation steps, Committee Muktamar 20th Muhammadiyah Student Association will show the results of the election calculations to all participants. From all of candidates formatur, will take the nine higher formatur to be the Chairman of the Pimpinan Pusat Muhammadiyah Student Association. Then results of 9 of Formatur will elect one General Chairman of Muhammadiyah Student Association next period.

Besides using the use-case and activity diagrams, the system is also designed by sequence diagram. In Sequence Diagram (Fig.5) above explains that there are three classes in the making of the program, namely the Model View Controller (MVC). MVC is a pattern that differentiate Logical Controller programming, database and interface separately. So MVC architecture its very easy in maintenance and further development of the system.

One Framework PHP which uses the concept of full MVC is Code Igniter. Code Igniter (CI) is an application development framework using PHP for a framework which systematically are arranged, so it is very powerful for the manufacturing PHP system. Programmer does not need to scratch from the first, because framework already provides wide variety of library in need.

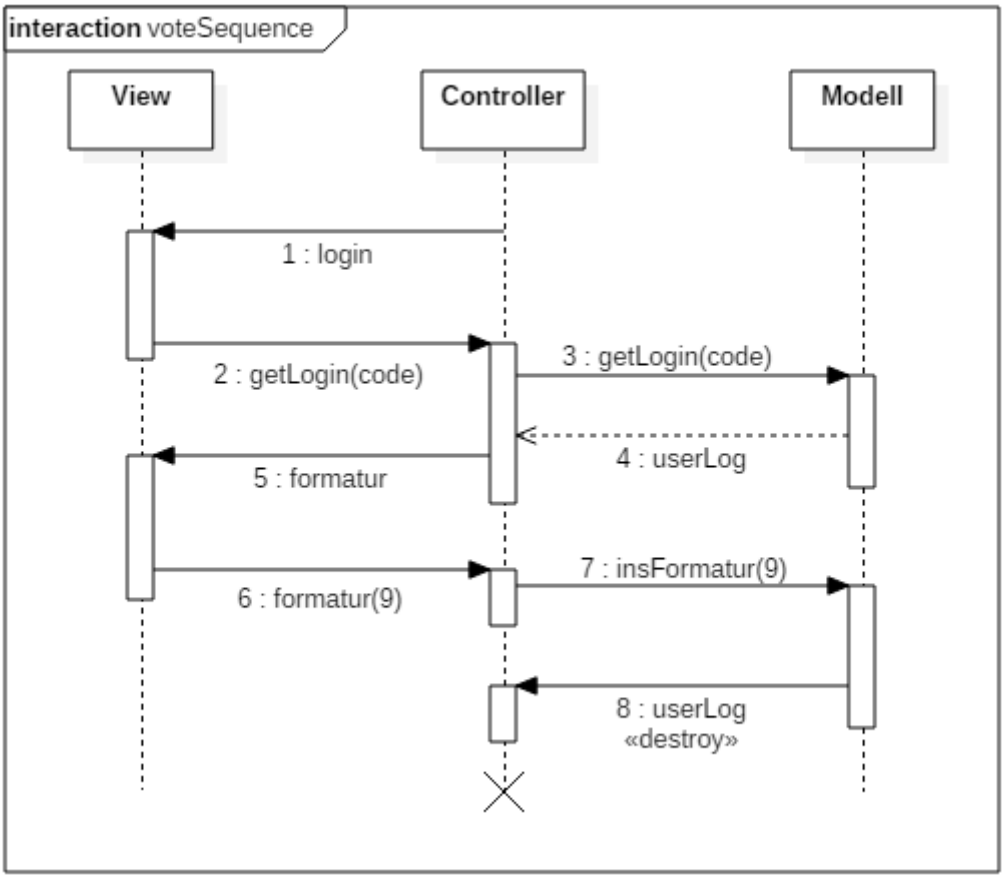

Figure 5 Sequence Diagram MVC

At this stage of Design, System eVoting 20th Muktamar Muhammadiyah Student Association using MySQL Server in connecting Client. When the prosess of election, the database server must be in a locked / password state so that the privacy and security of data is controlled. eVoting Muktamar Server Database is in local area, so it can not access by external network or internet connection. And There are four core Database Table in this system (Fig. 6), which is Voter, Formatur, Vote, and Userlog, Table has been encrypted using hash encryption method, is used to minimize data manipulation.. For the view using Bootstrap Material Design as Interface. By utilizing concept of 12 Grids, System can run on any device or responsively. Finally Sytem also using Jquery to make easy for send data to the server.

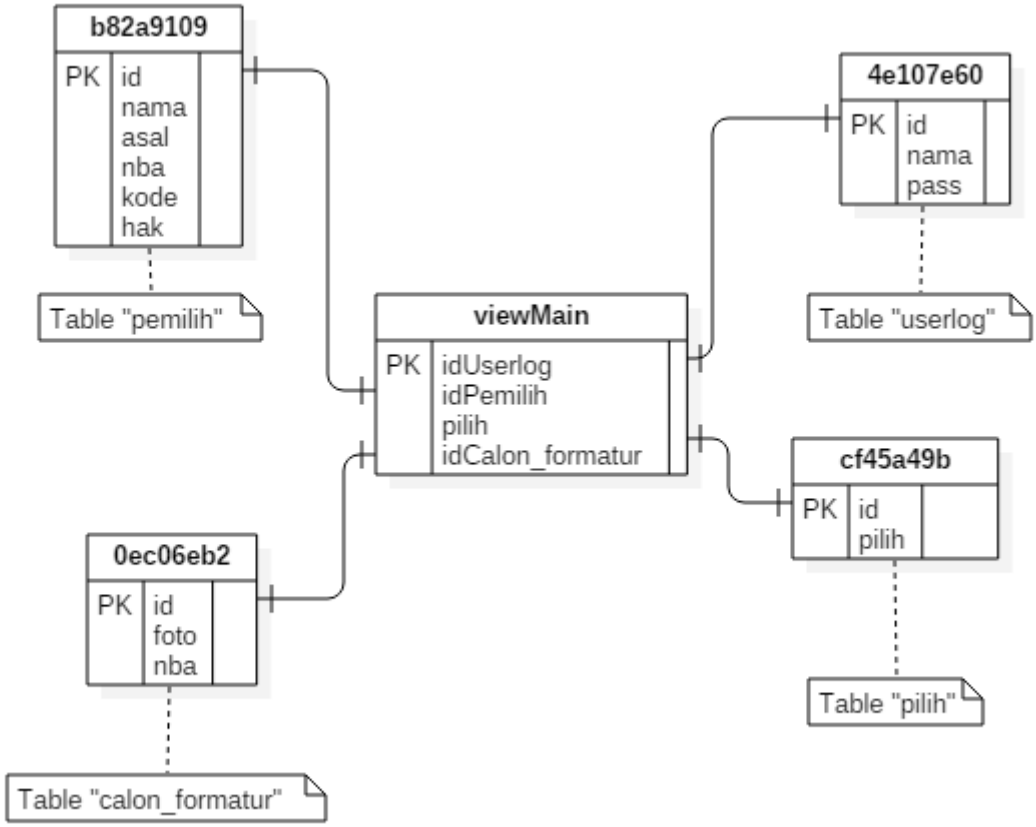

Figure 6 Database Diagram

This eVoting System Muktamar 20th IPM is tested using the Black Box Method Testing. In this method, the system will be run, observe and evaluate is already system in accordance with existing planning. Where this method is only focused on the result of the execution and functional applications. Its to evaluate the sytem eVoting interface system, regardless of the processes that occur in it. So that developers can develop this eVoting system with more functionality, so the results are expected unerror

3. IMPLEMENTATION

In Formulation eVoting 20th Muhammadiyah Student Association Muktamar Samarinda, there are two main page Controller, the Vote and Control. In CodeIgniter MVC concept, Controller is a part to connecting between the Model and the View. Controller have function to receive data from the user request and then determines what will be processed by the application.Vote page can be accessed only by the active voters that still have voting rights. For be entered in this page (fig. 7), voter must show the QR Code which is already contained in the ID Card on a camera that has been provided in beside Computer. Or you can also enter the access code is under QR Code at ID Card.

Figure 7 Login Voter Page

In the main fornt page of Vote (Fig. 8), Voters can only choose 9 Candidates Formatur by pressing the on the photo or the "vote" Button, can not be less or more. If Voters simply chose less than 9 Candidate Formatur, then the Submit button in the sidebar will not work.

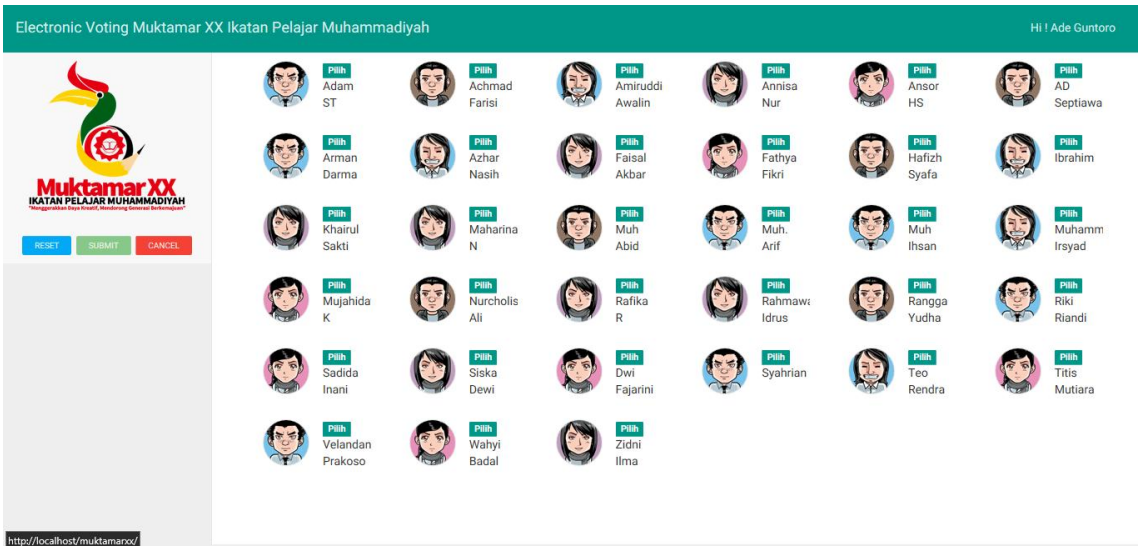

Figure 8 Front Page Voter

Similarly, if a voter voted more than 9 Candidate Formatur, the System will automatically give alert of this (Fig 9). After choose 9 Candidate Formatur then the voter can press the "Submit" button in the sidebar, then it will appear Confirmation Pop Up Windows (Fig 10). After an election, the user access rights will automatically disappear, and not able to vote again.

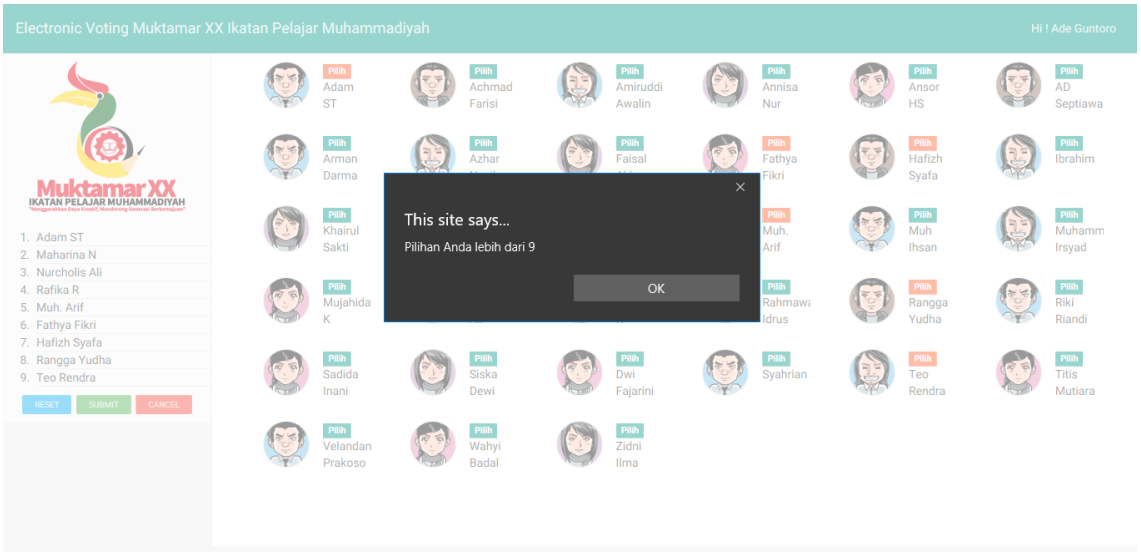

Figure 9 Alert if Vote more than 9

Reset button is used to reset the choice, while the Cancel button is used to exit the system without vote. When finished selecting, voter will be given a new QR Code as proof of election, which will be put into the voting booth. The new QR code will be used reVoting if certain things are not in want, such as distrust of Muktamar participants.

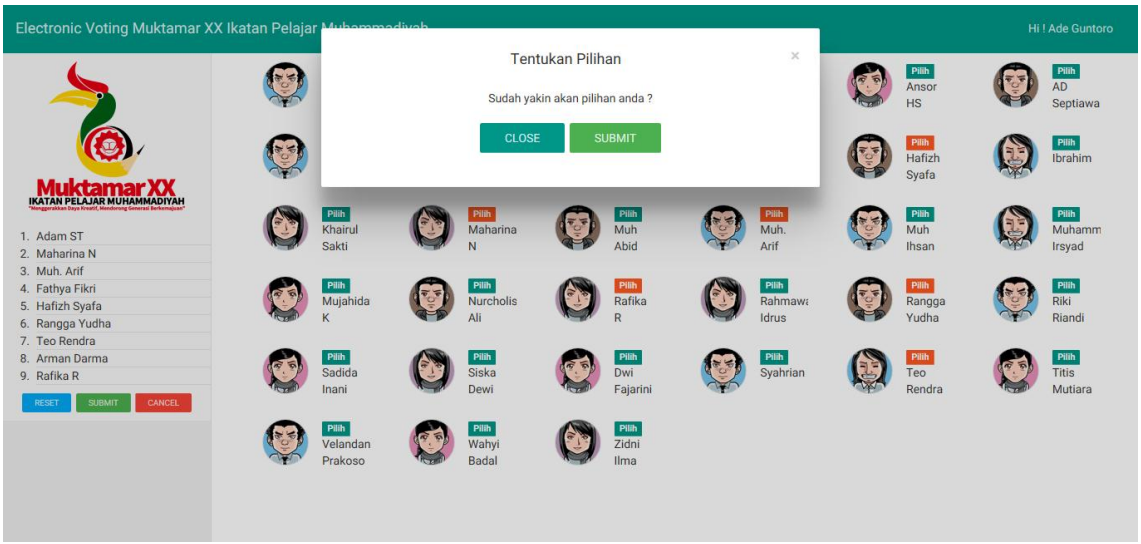

Figure 10 Alert Before Finish

The Second Main Controller is Control Page. This page is used to manage the eVoting of Muktamar 20th IPM. For example, adding to the list of voters, formatur, and graph the percentage of votes. Access to log on this system is owned by the admin of the Election Committee itself (Fig 11

), and when the elections take place, nobody are allowed to use the server selection. Server election will be open at the election is completed. Server of Muktamar 20th IPM is locally, it's to minimize data manipulation

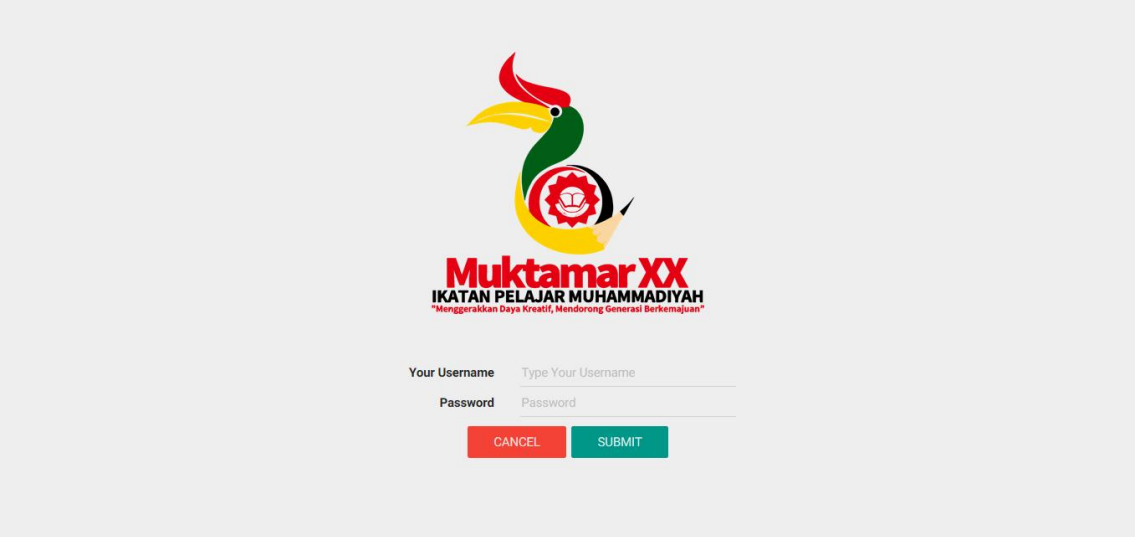

Figure 11 Login Control

Control Dashboard (Fig 12) page will show the percentage of votes each candidate formatur. The Nine highest vote will be the formatur of Muhammadiyah Student Association. And also be displayed the total number of temporary voters, the voters it self and the voters who use their right to vote.

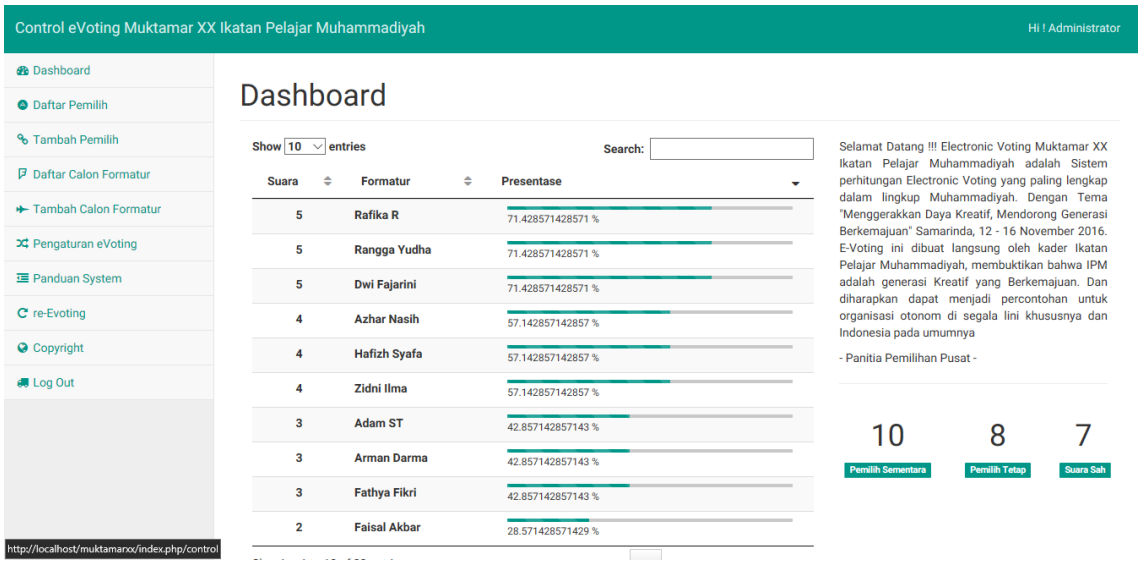

Figure 12 Dashboard Control

On the menu voter list (Fig 13), admin committe election can edit, add or delete voters in Muktamar 20th IPM. Voters itself there are two categories, which is temporary and permanent. Temporary Voters are voters who are already registered at the beginning but has not been re-registration. While the Permanten voters are voters who are already registered at the beginning and has been re-registration. There is a Vote Code that generated automatically by Hash method. It's Vote Code will be print and generate by QR Code and will used by voters to login the Vote Page.

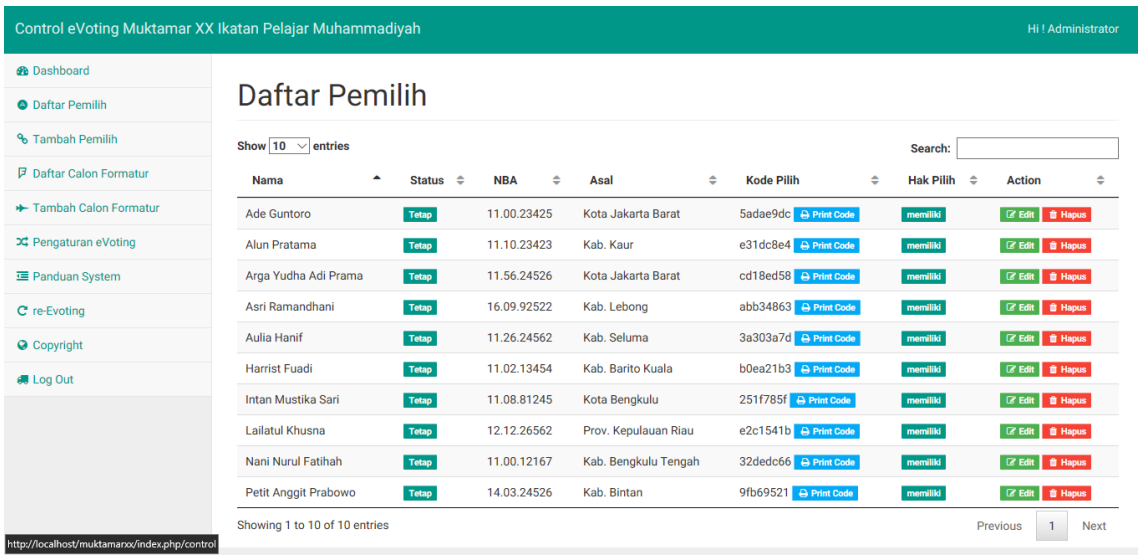

Figure 13 List of Voter

The Candidates of Formatur Page (Fig 14), admin can add, edit and delete Candidate Formatur of Muktamar 20th IPM. Formatur will sort at Ascending modell for his name. In the Page Vote, Candidate of Formatur will be displayed in the form of photos and names of candidates its to make easier for voters choice.

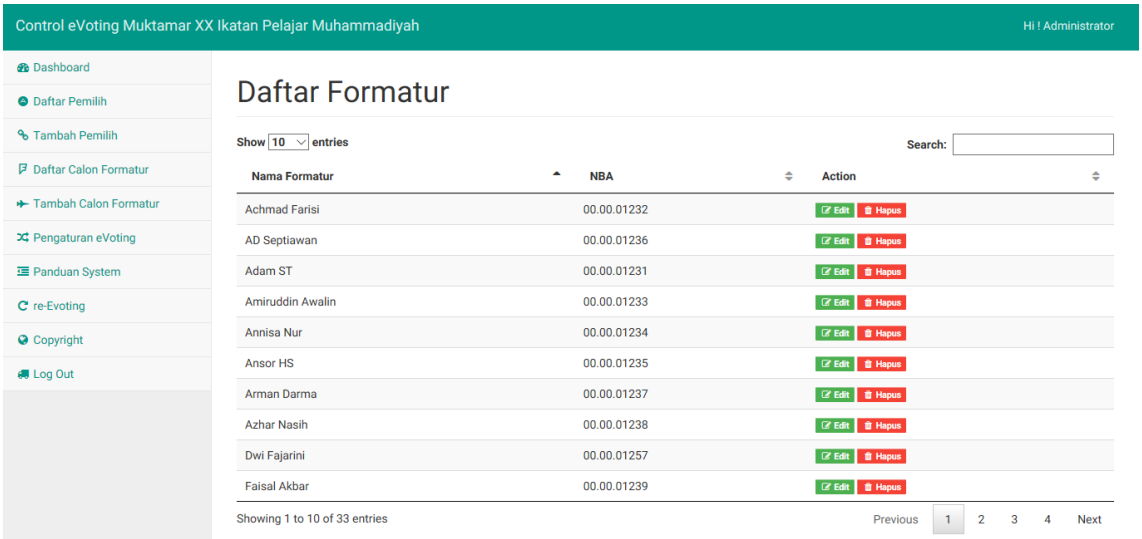

Figure 14 List Formatur

On page reVoting (Fig 15), admin and the Election Committee can review the election results of the QR Code on the input in the election booth. reVoting applicable to an agreement of the Election Committee and the Muktamar participants. So that the result of this eVoting can be received without disappoint.

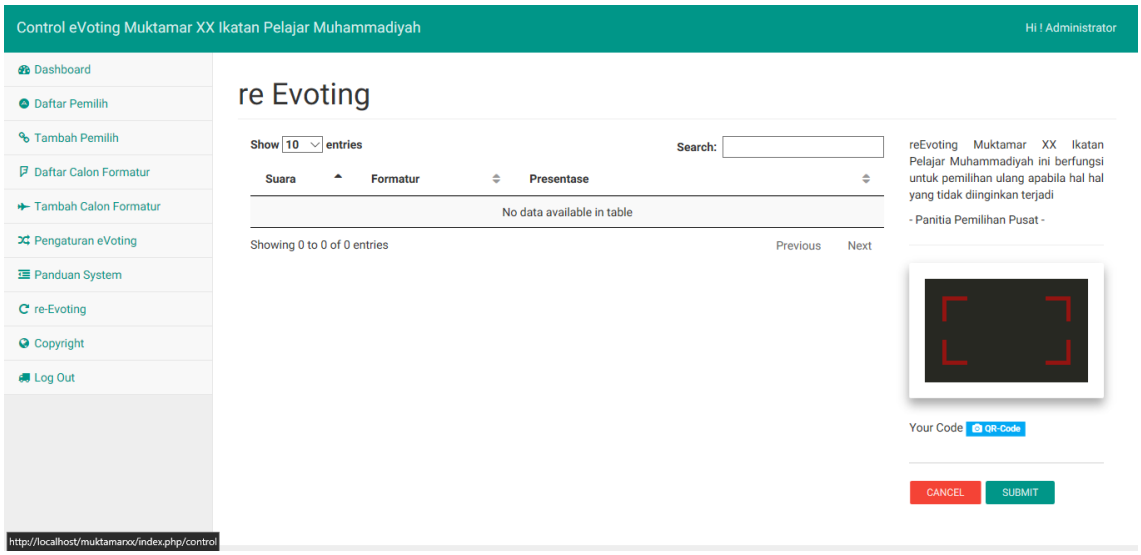

Figure 15 ReVoting

In setting eVoting page (Fig 16) there are some things in can be manage, there are Access Admin Login, Upload Participants use Excel file, QRCode Print Settings, Reset List of Voters, Reset List of Formatur, Reset recapitulation of calculations, and Reset reVoting

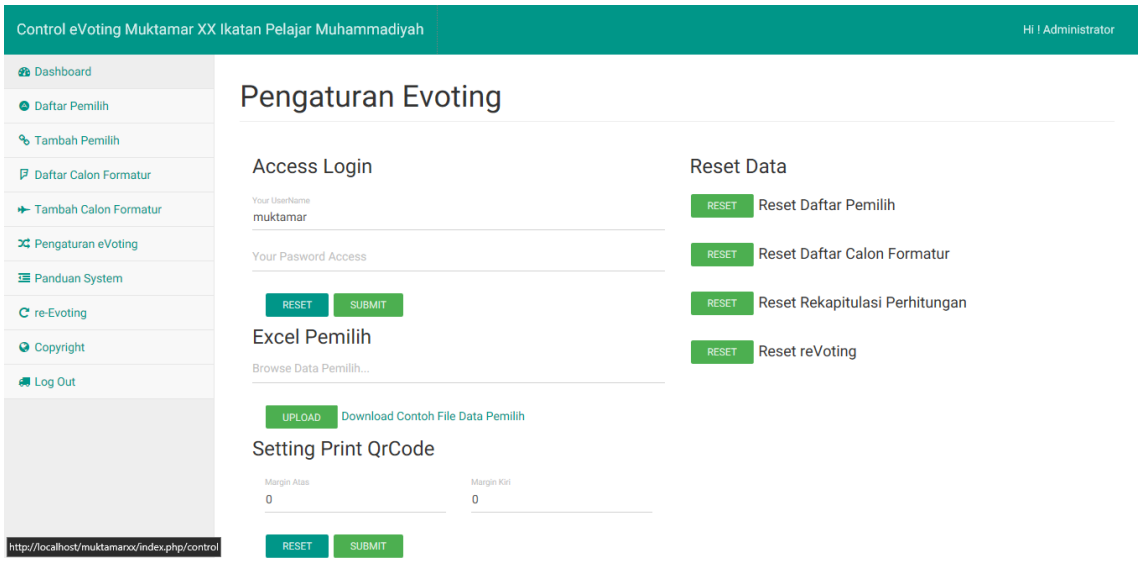

Figure 16 eVoting Setting

In the final step, the author uses the method of Black Box Testing (Table 1) in software testing functionality. in this eVoting, the reference in use are of the use-case diagrams. Where this method is only focused on the result of the execution and functional applications. Its to evaluate the sytem eVoting interface system, regardless of the processes that occur in it. So that developers can develop this eVoting system with more functionality, so the results are expected unerror.

Tabel 1 Testing eVoting Muktamar

Fungsionality	Description	Actor	Result
CRUD Formatur	Actor can Create, Read, Update, Delete Formatur	Adminitrator	√
CRUD Voter	Actor can Create, Read, Update, Delete Voter	Adminitrator	√
See Calculation	Actor can see calculaton of Formatur	Adminitrator	√
Vote Formatur	Voter can Vote Formatur who has chossen	Voter	√

4. CLOSING

The conclusions of the Final Project with the title of eVoting of Muktamar 20th IPM Using CodeIgniter is as follows:

1) This eVoting System can reduce Election Conventional problems, such as Calculation Time, Paper Printing Costs and Human Error Calculation
2) This eVoting System is designed using Code Igniter framework that uses the Model View Controller (MVC) concept of so that developers can develop easily.
3) Login to eVoting System using QR Code it's more easy to use and the Code Login has been encrypted so the security is trusted

System eVoting IPM 20th Muktamar is still far from perfect because there are still things that need to be improved in the future development. Suggestions for future development are:

1) It needs a special code such as NBA (Nomor Baku Anggota), so that each voter can sign up more briefly, without the need for a long registration process.
2) Need a specific guidelines, so it can be used into school, the Basic of IPM, Because the system is already use in some Province but it should be with the Special mentor.

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